

THE RELATIONSHIP BETWEEN STUDENTS' PERCEPTION OF TEACHER'S TEACHING MATERIALS AND LEARNING MOTIVATION IN THE SUBJECT OF MOTORCYCLE CHASSIS MAINTENANCE

Dani Irawan¹, Ifans Dwi Permady², Lindung Hidayat Ernadi³, M. Aldi Kurniawan⁴,
Marshandita Albar Tanka Piscesa⁵, M. Dzikki Maulan⁶, Kholaf Khubaisy⁷

^{1,2,3,4,5,6,7}Universitas Negeri Malang, Malang, Indonesia

Email: dani.irawan.ft@um.ac.id

Abstract

This study aims to (1) describe students' perceptions of teacher teaching materials, (2) describe learning motivation, and (3) test the relationship between the two variables in the Motorcycle Chassis Maintenance subject in grade XI of SMK Public Works Malang. The study used a correlational quantitative survey involving all 20 students through saturated sampling. Data were collected using a five-level Likert scale questionnaire consisting of 38 items on teaching material perceptions and 30 items on learning motivation. Analysis included descriptive statistics, categorization based on theoretical score ranges, the Shapiro–Wilk test, linearity checks, Pearson correlation, and reliability. The mean teaching material perception of 152.45 (SD=16.20) was categorized as high, while the mean learning motivation of 117.30 (SD=12.77) was also categorized as high. However, the Pearson correlation showed a very low relationship ($r=0.014$) and was not significant ($p=0.952$; $\alpha=0.05$). Thus, even though the average of both variables is in the high category, the data does not show a significant linear relationship between the perception of teaching materials and learning motivation in the class studied.

Keywords: *Student Perception; Teaching Materials; Learning Motivation; Vocational Education; Correlation.*

A. INTRODUCTION

Vocational education is designed to help students develop knowledge, skills, and attitudes relevant to specific fields of work. Research on learning media in vocational education emphasizes the importance of selecting learning resources appropriate to learning objectives and contexts (Sutirman et al., 2022), while studies of vocational high school students indicate that perceptions and motivations need to be examined within the specific context of vocational learning (Sharizan et al., 2024). In vocational high schools (SMK), these objectives are achieved through learning that connects conceptual knowledge with practical activities. The subject of Motorcycle Chassis Maintenance, for example, requires students to understand component functions, inspection procedures, working principles, and maintenance steps. Mastery of these competencies depends not only on practical opportunities but also on how concepts and procedures are explained, organized, and learned through the teaching materials used by teachers.

Instructional materials are resources that help teachers communicate learning objectives, concepts, procedures, examples, and exercises. They can include texts, modules, worksheets, images, visual media, or other resources used to support learning activities. In a vocational context, relevant instructional materials ideally help students connect technical terms with real-world components, understand work sequences, and remember procedures related to safety and accuracy. However, the availability of instructional materials alone does

not guarantee that all students will evaluate or use them in the same way. Students bring different experiences, prior knowledge, interests, and learning needs.

Student perception can be understood as how students receive, select, organize, and interpret information encountered in the learning environment. Kahu and Nelson (2018) explain that student learning experiences and engagement are formed at the intersection of personal factors and the educational context. From the perspective of self-determination theory, a supportive learning environment can be related to motivation by fulfilling the needs for autonomy, competence, and relatedness (Ryan & Deci, 2020). In learning, perceptions of learning materials can relate to language clarity, material structure, relevance of examples, ease of access, quality of illustrations, and the suitability of the material to learning needs. These perceptions are not a single objective assessment of the quality of learning materials, but rather represent students' reports of their experiences and evaluations of the materials they use.

Learning motivation refers to the drive that directs, activates, and sustains learning behavior toward specific goals. The learning literature distinguishes intrinsic drives—for example, interest and curiosity—from extrinsic drives such as support, rewards, or environmental demands. Ryan and Deci (2020) explain that the quality of motivation is influenced by the extent to which the environment supports basic psychological needs. Research on motivation and engagement also suggests that instructor support can be related to the development of student motivation during adolescence (Martin et al., 2024). In vocational education, motivation can be seen through students' willingness to follow explanations, complete assignments, try practical procedures, ask questions when they encounter difficulties, and maintain effort when a competency has not yet been mastered.

The relationship between perceptions of learning materials and motivation to learn is theoretically plausible, but not necessarily strong or significant. Learning materials that are perceived as clear and relevant may help students understand what to learn, reduce confusion, and clarify the connection between the material and practice. Conversely, motivation is also influenced by other factors, such as personal goals, self-efficacy beliefs, teacher and peer support, the learning environment, prior experiences, and task characteristics. Because these factors can operate simultaneously, the relationship between perceptions and motivation needs to be tested empirically rather than assumed from the outset.

The study was conducted in the 11th grade Motorcycle Engineering students at the Public Works Vocational School in Malang, studying Motorcycle Chassis Maintenance. In the odd semester of the 2024/2025 academic year, the average mid-term exam score for this subject was 76.3, with varying achievement among students. The mid-term exam data was used as the learning context, not as the primary outcome variable in this study.

It's important to distinguish the focus of this research from testing the effectiveness of instructional materials. The study did not develop new instructional materials, did not compare experimental and control groups, and did not implement a learning intervention. The correlational survey design only allows researchers to describe respondents' responses and estimate the strength and direction of the linear relationship between perception scores and motivation scores. Therefore, the term "relationship" is more appropriate than "influence" or "impact" when presenting the main results.

This study has three objectives. First, to describe students' perceptions of teachers' teaching materials in the Motorcycle Chassis Maintenance subject. Second, to describe students' learning motivation in the subject. Third, to test whether there is a significant relationship between students' perception scores of teaching materials and their learning motivation scores. Practically, the research results are expected to provide teachers with initial information to understand students' learning experiences and design more responsive evaluations of teaching materials. Its empirical contribution remains limited to a single school context and the small sample studied.

B. LITERATURE REVIEW

1. Student Perception of Teaching Materials

Perception is the process by which individuals assign meaning to stimuli or information received. The same information does not always produce identical assessments because the perception process is related to the individual's attention, experience, knowledge, expectations, and circumstances. In educational settings, student perception includes assessments of the learning situation, teacher behavior, peers, facilities, and available learning resources. Kahu and Nelson (2018) discuss perception as part of the psychological process that helps individuals understand their environment. Ryan and Deci (2020) also explain that interpretation of the environment is not solely determined by stimuli but can be influenced by the characteristics and experiences of the perceiver.

Teaching materials are materials or resources designed or selected to support the learning process. They can include learning objectives, conceptual descriptions, procedural steps, examples, illustrations, exercises, and evaluations. In vocational learning, teaching materials need to be aligned with competency objectives and learning activities so that students can connect technical terms with work procedures, components, tools, and practical situations (Sharizan et al., 2024; Nurainy & Sujarwo, 2025).

The perceptions of teaching materials in the research instrument are organized into several dimensions. The grid table contains aspects of teaching materials and ease of use, teachers' contributions and abilities in delivering teaching materials, and problems seen from environmental factors. These dimensions include ease of obtaining or using teaching materials, teachers' ability to select and integrate teaching materials, material elaboration and presentation, providing feedback, teaching material innovation, availability of supporting facilities, classmate support, teacher-student interaction, and access to teaching materials. Thus, the perception variables in this study are broader than simply assessing the appearance of documents or modules.

Clarity is one of the characteristics that can influence the usefulness of learning materials. Coherently structured material helps students recognize relationships between concepts and sequences of activities. In technical subjects, verbal explanations may need to be supplemented with pictures, diagrams, component names, or procedural examples so students can associate terms with objects and actions. Relevance is also important: examples related to components and work situations familiar to students can potentially help them understand the rationale for a procedure. However, this study did not separately measure the causal effects of clarity, illustration, or relevance. These aspects represent conceptual dimensions that help explain the scope of learning material perception.

Accessibility relates to students' ease of obtaining, reading, and using learning resources. Materials that are difficult to obtain, too dense, or inappropriate for their prior knowledge level can hinder their utilization. Conversely, structured and readily available learning materials can help students review the material independently. However, good access does not automatically lead to high motivation. Students may have the same access but differ in goals, interests, learning habits, and levels of confidence. Perceptions of learning materials need to be understood as one part of the broader learning experience.

The teacher's role in the use of teaching materials is also crucial. Teachers select resources, explain concepts, provide examples, adapt explanations to student responses, and provide feedback. Good teaching materials delivered without sufficient explanation can be difficult to understand, while clear teacher explanations can help students use learning resources more effectively. The instrument in this study included teachers' abilities to select, integrate, elaborate, present, and provide feedback related to teaching materials. Therefore, perception scores cannot be interpreted solely as an evaluation of a specific teaching material product.

The learning environment provides another context for perception. The availability of facilities, peer support, positive communication between teachers and students, and ease of access can shape the experience of using learning materials. In a chassis maintenance course, learning materials can serve as a bridge between classroom explanations and component observation or practice. Motorcycle chassis maintenance requires a connection between technical concepts, component recognition, and procedural application; therefore, learning materials need to be understood within the context of the competencies being taught. However, when practical facilities are limited or students do not have the opportunity to connect theory to the real world, learning materials may be perceived as less relevant. This study did not directly observe any of these facilities or interactions; indicators were gathered through respondents' perceptions.

Measuring perceptions using questionnaires allows for the summarization of multiple student responses into a quantitative score. This advantage is the efficiency and consistency of question presentation. However, questionnaires also depend on respondents' understanding of the items, the honesty of their responses, and the appropriateness of the indicators to the constructs being measured. The total score does not automatically reveal which dimensions are most problematic. To inform instructional material development decisions, item analysis and open-ended feedback can complement the total score in future research.

2. Motivation to Learn

Learning motivation is the process that drives individuals to initiate, direct, and sustain learning activities. Motivation encompasses not only enjoyment of a subject but also goals, willingness to exert effort, persistence when faced with difficulties, and the decision to try again. Ryan and Deci (2020) differentiate motivation based on the quality of its regulation. Self-determination theory literature emphasizes that the quality of motivation and support for psychological needs should be considered when interpreting learning behavior (Ryan & Deci, 2020). In the school context, teacher support can also play a role in students' motivation and engagement patterns during adolescence (Martin et al., 2024).

The learning motivation instrument includes intrinsic motivation, extrinsic motivation, academic goals and personal achievement, and self-directed learning. Intrinsic motivation relates to interest in the subject, while extrinsic motivation relates to rewards and environmental support. Academic goals and personal achievement relate to standards desired, while self-directed learning encompasses initiative, persistence, and time management. These dimensions describe the scope of the motivational construct measured through the questionnaire.

Intrinsic motivation can be reflected in curiosity, interest in understanding components, and satisfaction when successfully completing a task. In the context of motorcycle chassis maintenance, students may be interested when the material can be connected to the function of components they are familiar with or vehicle problems they encounter daily. However, an interest in the automotive field does not necessarily mean every technical topic will be easy or interesting. The level of difficulty, practical experience, explanation style, and previous successes can influence students' responses to an activity.

Extrinsic motivation relates to outcomes or consequences external to the activity itself, such as grades, rewards, teacher support, family support, or career prospects. Social support can help students maintain effort, especially when they have not yet mastered a procedure. However, the same environmental support can be perceived differently by students with different experiences and needs. In this study, both rewards and environmental support were included as indicators of the motivation instrument, but the reported data did not separate the contribution of each indicator to the total score.

Academic and personal achievement goals relate to students' reasons for striving to achieve specific standards. Students who understand learning objectives may be better able to see the benefits of practice and monitor their own progress. In vocational education, these objectives might relate to the ability to perform inspections, recognize signs of damage, or carry out maintenance procedures in sequence. However, this study measured motivation through respondents' perceptions in a questionnaire, not through direct observation of the accuracy or duration of practice. Therefore, motivation scores cannot be equated with evidence of technical skill.

Self-directed learning refers to students' initiative in organizing their learning activities and managing their time. Students with a drive for self-directed learning may review material before class, repeat explanations, complete assignments, or seek clarification when they encounter difficulties. These habits can help students navigate material that requires gradual mastery. However, the ability to self-directed learning also depends on access to resources, environmental support, and available learning strategies. Questionnaire measurements capture student reports of these tendencies, not longitudinal behavioral records.

Motivation is dynamic and can change with learning experiences. Successful completion of a task can strengthen students' confidence, while repeated difficulties without feedback can diminish persistence. Teacher support, practice opportunities, peer relationships, and perceptions of the relevance of learning can shape these experiences. Because this study used a survey at a single point in time, the results cannot show how motivation changes throughout the semester or how those changes relate to the use of instructional materials over time.

3. The Relationship between the Perception of Teaching Materials and Learning Motivation

Conceptually, perceptions of learning materials and motivation to learn may be interrelated because learning materials are part of the environment students encounter when learning. If learning materials are perceived as clear, structured, relevant, and usable, students may more easily understand task demands and see the value of learning activities. This clarity has the potential to reduce confusion and help students focus their efforts on understanding the material. Conversely, learning materials that are perceived as difficult to access or inappropriate for students' needs can increase workload and reduce interest. This argument provides a rationale for examining the relationship between the two variables, but it does not prove that perceptions necessarily determine motivation.

The relationship may also be nonlinear or non-dominant. Perceiving good learning materials may not necessarily lead to high motivation if students lack interest in the subject, experience personal challenges, fail to see the benefits of the material, or encounter a less than supportive learning environment. Conversely, highly motivated students may persist even if the learning materials are perceived as less engaging. Furthermore, perception and motivation are measured through questionnaires that both rely on self-report; response style, the mood during the questionnaire, and the tendency to respond positively can influence scores.

Research in vocational education has examined student perceptions and motivation in the context of content-based learning and the use of teaching materials and media (Sharizan et al., 2024; Sutirman et al., 2022). Other studies have highlighted the measurement of learning motivation in vocational high school students and its relationship to job readiness (Ningsih et al., 2025; Tentama & Arridha, 2020). These findings demonstrate the relevance of perceptions and motivation in vocational education, but the subject context, constructs, sample characteristics, and instruments vary. Therefore, the results of previous studies need to be interpreted contextually and cannot be directly generalized to Motorcycle Chassis Maintenance students.

The contribution of this study is to provide an empirical overview specific to the context of one eleventh grade Motorcycle Engineering class. Correlation analysis can indicate whether variations in perception scores move in the same direction as variations in motivation scores in the sample. A positive coefficient indicates a trend in the same direction, a negative coefficient indicates a trend in the opposite direction, and a coefficient near zero indicates a very weak linear relationship. Statistical significance further assesses the data's agreement with the null hypothesis, not a measure of practical importance or causal evidence. With small samples, estimates can lack precision, so nonsignificant results should be interpreted as insufficient evidence, not proof that a relationship exists at all.

Based on the description, the research hypothesis is formulated as follows: H0 states that there is no significant linear relationship between students' perceptions of teacher teaching materials and learning motivation; H1 states that there is a significant linear relationship between the two variables. Testing was conducted at a significance level of 0.05. This hypothesis is in accordance with the correlational design and does not state that perception causes changes in motivation.

4. A Synthesis of Recent Research on Perceptions of Instructional Materials and Motivation

Studies on learning motivation show that motivation does not exist in isolation but develops through the interaction of student characteristics, instructor support, instructional design, and learning experiences. The student engagement framework emphasizes that structural and psychosocial factors shape learning experiences, which in turn are related to engagement (Kahu & Nelson, 2018). The self-determination theory perspective highlights the importance of supporting the needs for autonomy, competence, and relatedness to maintain both intrinsic and internalized extrinsic motivation (Ryan & Deci, 2020). Therefore, perceptions of learning materials are one component of the learning environment, not the sole determinant of motivation.

In vocational education, teaching materials and learning media need to be linked to competency objectives and activities that approximate work practices. Studies on online media in vocational education position media selection as a pedagogical decision that needs to consider student characteristics and the learning context (Sutirman et al., 2022). Research in the vocational context also examines perceptions and motivations toward content-based learning (Sharizan et al., 2024), while studies in Indonesia highlight the relationship between learning motivation and vocational high school students' work readiness (Tentama & Arridha, 2020). This evidence supports the relevance of this research problem, but does not guarantee that assessment of teaching materials will always correlate significantly with motivation in each class.

Research on digital learning materials has yielded mixed results. A study on the development of e-modules integrating metacognitive guidance and motivational regulation emphasized that material design can foster independent learning when learning regulation strategies are explicitly presented (Nurainy & Sujarwo, 2025). A meta-analysis of digital textbooks reported support for intrinsic motivation but did not find the same pattern of improvement for extrinsic motivation (Lei et al., 2026). Meta-analytic studies on digital media also indicate that motivational benefits can vary depending on the characteristics of the media and its implementation (Sari et al., 2026). Thus, labels such as “digital” or “engaging” alone are not sufficient to describe the quality of learning materials; content clarity, appropriateness to the task, accessibility, and teacher support still need to be considered.

Recent research also suggests that instructor support can be related to motivation through multiple pathways. A longitudinal study of adolescents found that instructional support plays a role in the trajectory of motivation and engagement over several years (Martin et al.,

2024). Other research suggests that teacher support and classroom experiences can be related to online engagement through motivational mechanisms (Li, 2025), while research on instructor behavior in Indonesian vocational education links instructor behavior and self-motivation to learning quality and vocational competency (Suyatmo et al., 2025). These findings strengthen the argument that students' perceptions of instructional materials need to be situated within the broader learning ecosystem.

However, research findings on interventions and media are not always consistent. A meta-analysis of problem-based, project-based, and case-based learning reported that active learning strategies need to be differentiated by design and implementation conditions when addressing motivation (Wijnia et al., 2024). A meta-analysis of digital pedagogical agents found clearer results for some aspects such as interest and self-efficacy expectations, but not all motivational beliefs changed significantly (Gladstone et al., 2025). A meta-analysis of gamification in K–12 education also emphasized the need to assess variation in effects, rather than assuming that every game element necessarily increases motivation (Kurnaz & Koçtürk, 2025). This literature supports caution in interpreting simple correlations from small samples.

The relationship between perception and motivation must also be understood in the context of measurement. Clark and Watson (2019) emphasize the importance of systematically establishing instrument validity, while results from measurements of self-efficacy and achievement beliefs indicate that students' beliefs do not always perfectly align with actual performance (Talsma et al., 2018; Martin et al., 2024). In the context of vocational high schools, the development of a learning motivation scale specifically for vocational students demonstrates the need for evidence of validity and reliability appropriate to the target population (Ningsih et al., 2025). Therefore, the questionnaire scores in this study are read as reports of perceptions and motivation measured by the instrument, not as a single objective measure of the quality of learning materials or learning behavior.

Research on learning media for vocational high school students in Indonesia, including a meta-analysis of learning media and motivation (Zaki et al., 2025) and a review of digital media use (Faris et al., 2025), indicates that media is an aspect worthy of study, but the context, media type, and quality of the study must be considered. Studies on student perceptions of digital media also indicate perceived benefits as well as barriers to access and use (Savitri & Ratri, 2025). Research on motivation and work readiness emphasizes that motivation is related to factors broader than just material, such as learning facilities and soft skills (Kamal et al., 2025). Studies on motivation and learning activities in educational contexts also report various factors related to student engagement (Zhang & Kim, 2025).

In the context of online learning and changing learning conditions, research on vocational high school students has highlighted the need for motivational instruments appropriate to the context and learning conditions they face (Ningsih et al., 2025). Studies on internet service quality and class structure during distance learning also show that access and learning organization factors can be related to educational outcomes (Odiana et al., 2022). Research on vocational education during the pandemic emphasizes that changes in learning activities can alter the experiences of students and teachers (Odiana et al., 2022). These findings are relevant for context, but should not be used to assume that the respondents in this study experienced the same conditions.

Several contemporary studies examine the relationship between motivation and engagement, self-efficacy, or academic success. Tadesse et al. (2022) examined the role of socioeconomic status in vocational students' learning motivation through a mediation model, while Talsma et al. (2018) demonstrated that the relationship between self-efficacy and achievement can be reciprocal in longitudinal data. Both studies emphasize that motivation is part of a network of interconnected factors. Because these studies only measured two variables

through a single-point survey, their analytical models are more limited and cannot test mediation pathways or changes over time.

Research on motivational teaching strategies in vocational schools also highlights the importance of supportive behavior, recognition for effort, and a comfortable learning environment (Nguyen & Tran, 2025). Another study on teacher support for student engagement emphasized the motivational mechanisms linking perceived support to engagement (Zhang & Kim, 2025). Overall, the literature positions instructional materials as a meaningful but limited component in explaining motivation. The gap addressed by this article is contextual evidence on the relationship between perceived instructional materials scores and motivation scores in the Motorcycle Chassis Maintenance course in a single vocational high school class.

Additional evidence suggests that the relationship between motivation and learning context can operate through multiple mechanisms and is not always straightforward. Tadesse et al. (2022) examined the relationship between socioeconomic conditions and learning motivation in vocational students through mediation analysis, while Kamal et al. (2025) reported that learning facilities and soft skills were associated with motivation and work readiness in vocational high school students. In the context of learning strategies, Nguyen and Tran (2025) examined the perceptions of vocational teachers and students regarding motivating teaching strategies. Findings from digital media also indicate that student perceptions can encompass both benefits and barriers to use (Faris et al., 2025; Savitri & Ratri, 2025), while a systematic review of gamification in LMSs highlights the importance of learning element design and user characteristics (Sari et al., 2026). Studies on teacher behavior and self-motivation in vocational education also demonstrate that motivation exists within the broader learning ecosystem (Suyatmo et al., 2025). These references strengthen the conceptual foundation but do not replace empirical testing on this research sample.

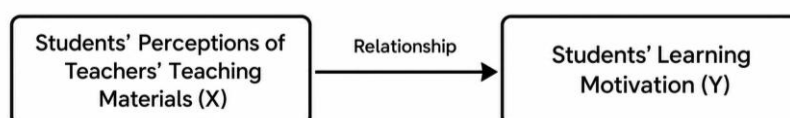


Figure 1. Conceptual Model of the Relationship between Students' Perceptions of Teaching Materials and Learning Motivation

C. METHOD

This study used a quantitative approach with a correlational survey design. The quantitative approach was used because the research variables were measured through questionnaire scores and analyzed using statistics. The correlational design was chosen to test the direction and strength of the relationship between students' perceptions of teacher teaching materials as variable X and learning motivation as variable Y. This design did not involve variable manipulation, random assignment, or comparison groups and therefore was not used to draw causal conclusions.

The research was conducted at SMK Public Works Malang for class XI Motorcycle Engineering competency for the Motorcycle Chassis Maintenance subject. Data collection was conducted in the context of the 2024/2025 academic year.

The accessible population of the study was all 20 11th-grade Motorcycle Engineering students taking the Motorcycle Chassis Maintenance course at SMK Public Works Malang in the 2024/2025 academic year. The method section of the source states that respondents came from all students in that class and numbered 20 people; because the number involved was equal to the accessible population, the most consistent technique was saturated sampling (total sampling), not purposive sampling. Thus, the results describe the entire class targeted for data collection, but do not automatically represent other classes or schools. The subject teachers became the learning context, not the respondents in the correlation analysis.

The research instrument was a closed-ended questionnaire with a five-level Likert scale. The learning materials perception questionnaire consisted of 38 items, while the learning motivation questionnaire consisted of 30 items. The perception grid included ease of use of learning materials, teachers' ability to select and deliver learning materials, and environmental aspects related to facilities, peer support, teacher-student interaction, and access to resources. The motivation grid included intrinsic motivation, extrinsic motivation, academic goals/personal achievement, and independent learning. Response scores were summed to form a total score for each variable. Available sources do not fully explain the rules for reversing negative item scores; this is a limitation of the instrument reporting.

Data were collected using closed questionnaires filled out by students and analyzed using SPSS version 27. The processing stage included data examination, score preparation, descriptive statistics, prerequisite tests, relationship testing, and instrument reliability checks.

Descriptive analysis included the mean, standard deviation, minimum-maximum score, and level categorization based on the theoretical score range. Since the questionnaire used a 1–5 Likert scale, the theoretical score for perception (38 items) ranged from 38 to 190 and the theoretical score for motivation (30 items) ranged from 30 to 150. To provide transparent interpretation, the theoretical range of each variable was divided into three categories with equal interval widths: low, medium, and high. The interval formula is $I = (S_{\max} - S_{\min}) / 3$, with $S_{\max}$ as the maximum ideal score and $S_{\min}$ as the minimum ideal score. The category boundaries were rounded to whole number total scores without overlap, as shown in Table 2. The categories were applied to the group mean, not to indicate the number of students in each category because the distribution of individual scores per category was not available.

Table 1. Statistical formulas used in data analysis

Analysis	Formula	Information
Average	$\bar{x} = \sum x_i / n$	x_i = respondent score; n = number of respondents
Standard deviation	$s = \sqrt{[\sum (x_i - \bar{x})^2 / (n - 1)]}$	Describes the distribution of sample scores
Range	$R = X_{\max} - X_{\min}$	Difference between maximum and minimum scores
Pearson Correlation	$r = \frac{\sum [(X_i - \bar{X})(Y_i - \bar{Y})]}{\sqrt{\sum (X_i - \bar{X})^2} \sqrt{\sum (Y_i - \bar{Y})^2}}$	Measuring the direction and strength of a linear relationship
Significance test t	$t = r \sqrt{[(n - 2) / (1 - r^2)]}$, $df = n - 2$	The p -value is compared with $\alpha = 0.05$.
Coefficient of determination	$r^2 \times 100\%$	Proportion of shared linear variation; not causal evidence
Internal reliability (Cronbach alpha)	$\alpha = [k / (k - 1)] [1 - (\sum \sigma_i^2 / \sigma_t^2)]$	k = number of items; σ_i^2 = item variance; σ_t^2 = total score variance
Normality (Shapiro–Wilk)	$W = (\sum a_i x_{(i)})^2 / \sum (x_i - \bar{x})^2$	Calculated by software; interpretation using p and $\alpha = 0.05$

Table 2. Determination of Categories Based on Theoretical Score Ranges

Variables	Minimum Ideal Score	Maximum Ideal Score	Category Interval	Category Limits (Low; Medium; High)
Perception of teaching materials (38 items)	38	190	$(190 - 38) / 3 = 50.67$	Low: 38–88; Medium: 89–139; Height: 140–190

Learning motivation (30 items)	30	150	$(150-30)/3 = 40$	Low: 30–70; Medium: 71–110; Height: 111–150
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Note: The sample standard deviation formula uses $n-1$ as the denominator. For Pearson correlation, the interpretation of the coefficient must be accompanied by the p-value and the context of the sample size. A p-value > 0.05 means that the null hypothesis cannot be rejected at that level; this decision is not proof that the population relationship is necessarily zero.

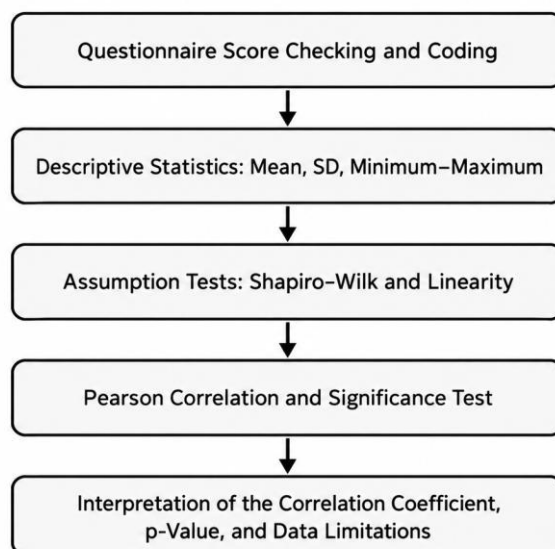


Figure 2. Research Data Analysis Flow

Data analysis was conducted in stages. Descriptive statistics were used to describe the distribution of scores. The normality of each score was checked using Shapiro–Wilk and linear relationships were checked before Pearson correlations were calculated. Relevant formulas are summarized in Table 1. The significance of correlations was tested using the t statistic with $n-2$ degrees of freedom and a two-tailed significance level of $\alpha = 0.05$. Internal reliability coefficients were calculated using Cronbach's alpha; the source-reported values were 0.971 for the 38 perception items and 0.970 for the 30 motivation items. High alpha values indicate internal consistency in the tested data, but do not in themselves prove construct validity. For $r = 0.014$ and $n = 20$, the test statistic is $t = 0.014\sqrt{18/(1 - 0.014^2)} \approx 0.059$ with $df = 18$, consistent with the source-reported two-tailed p of approximately 0.952. This calculation is an arithmetic check of the reported statistics, not a recalculation of the individual data.

The instrument was evaluated through item validity and internal reliability tests. The Cronbach's alpha coefficient obtained was 0.971 for 38 perception items and 0.970 for 30 motivation items. Alpha coefficients estimate internal consistency and cannot replace evidence of construct validity. Assessment of item validity requires consideration of item correlation and the testing procedure used (Clark & Watson, 2019; Ningsih et al., 2025).

Pearson's correlation analysis yielded a coefficient of $r=0.014$ with a $p=0.952$. The model summary also listed $R=0.014$, $F=0.004$, and a significance level of 0.952. These results indicate a very weak linear relationship and are not statistically significant at the 0.05 level.

D. RESULT AND DISCUSSION

1. Respondent Characteristics and Descriptive Statistics

The number of respondents analyzed was 20 eleventh-grade Motorcycle Engineering students. Sources state that all respondents were male and aged 16–17. These characteristics describe the group studied, but they cannot be used to generalize about all vocational high school students or conclude that gender or age cause certain patterns of perception and

motivation. Because the sample came from a single class and school, the results are best read as a contextual overview.

Descriptive statistics and mean categories for both variables are summarized in Table 3. The perception score had a mean of 152.45 and a standard deviation of 16.20, with a minimum score of 123 and a maximum score of 189. Based on the theoretical range of 38–190, the perception mean was in the high category (high category limits 140–190). The motivation score had a mean of 117.30 and a standard deviation of 12.77, with a minimum score of 95 and a maximum score of 136. Based on the theoretical range of 30–150, the motivation mean was also in the high category (high category limits 111–150). These categories apply to the group mean; there were insufficient data to calculate the number of students in the low, medium, or high categories.

Table 3. Descriptive statistics and mean categories of research variables

Variables	N	Minimum	Maximum	Range	Average	Standard deviation	Variance
Students' perceptions of teaching materials	20	123	189	66	152.45	16.20	262,471
Motivation to learn	20	95	136	41	117.30	12.77	163,168

For the perception variable, the mean score of 152.45 is in the high category according to the theoretical score limits described in the methods section. This result indicates that, in aggregate, students tend to rate the teacher's teaching materials relatively highly. However, the average category does not necessarily mean that all students have high perceptions. The minimum score of 123 indicates that some students scored lower than the average, while individual frequency distributions are not available to calculate proportions for each category. Therefore, interpretation must be limited to the trend of the group's average score.

For the motivation variable, the mean of 117.30 is in the high category based on the theoretical range of 30–150. Descriptively, the group's average score indicates a relatively high level of motivation according to the categorization rules used. However, this category does not explain how many students have low, medium, or high motivation; determining these proportions requires individual score data or category frequency tables not presented in the source.

2. Normality and Linearity Tests

The Shapiro–Wilk results are presented in Table 4. The test statistic for perception is 0.980 with $p=0.932$, while the test statistic for motivation is 0.926 with $p=0.128$. Both p -values are greater than 0.05. Thus, based on the reported tests, there is insufficient statistical evidence to reject the assumption of normality for each score. In small sample sizes, the results of the normality test still need to be understood along with visual inspection and data characteristics; a large p -value is not an absolute guarantee of a normal distribution.

Table 4. Results of normality test

Variables	Shapiro–Wilk Statistics	N	p	Interpretation at $\alpha=0.05$
Students' perceptions of teaching materials	0.980	20	0.932	Does not reject the assumption of normality
Motivation to learn	0.926	20	0.128	Does not reject the assumption of normality

The linearity test is performed as a prerequisite for analyzing linear relationships. This assumption check is important because the Pearson correlation summarizes the linear relationship between two scores and does not describe all possible relationships.

3. The Relationship between Perception of Teaching Materials and Learning Motivation

Pearson's correlation analysis yielded a coefficient of 0.014 with a significance value of 0.952. This coefficient, which is very close to zero, indicates a very weak linear relationship between the learning material perception scores and the learning motivation scores in this sample. Since $p=0.952$ is greater than the 0.05 significance level, the null hypothesis cannot be rejected. Therefore, the research data do not show a significant linear relationship between the two variables in the analyzed sample.

Table 5. Summary of relationship analysis results

Analysis	Mark	Meaning
Pearson Correlation (r)	0.014	Very weak positive linear relationship
Significance of correlation (p)	0.952	Not significant at $\alpha=0.05$
R in the summary model	0.014	Relationship compatibility is very low
F in the ANOVA model table	0.004	Reported model statistical values
Significance of the model	0.952	The model is not significant at $\alpha=0.05$
Coefficient B of perception	0.011	Reported regression coefficients; not causal evidence

Table 5 summarizes the correlation coefficients and model statistics related to the relationship between the two variables. The F-value of 0.004 and p-value of 0.952 indicate that the model is not significant. The B-coefficient of 0.011 indicates a very small model slope in the scoring units used. Because the study design is correlational, this coefficient cannot be interpreted as evidence that perception causes increased motivation.

Descriptive results show that students gave varying scores on their perceptions of learning materials and learning motivation. This variation is important because a class does not always have a homogeneous learning experience. Even though students study the same subject, they can differ in their prior knowledge, experience with motorcycles, reading habits, access to learning resources, personal goals, and comfort with asking questions to the teacher. The total score provides a summary but does not identify the source of these differences. For the purposes of improving learning, analysis by dimension and discussions with students can help explain why some students gave higher or lower scores.

Using the theoretical score range and three-category intervals, the perception mean of 152.45 falls into the high category, as does the motivation mean of 117.30. These categorizations allow for consistent descriptive answers to the first two research questions. However, categorization based on group means cannot be used to assert that all respondents fall into the high category. To make claims about student distribution, individual data grouped into low, medium, and high categories is necessary.

Theoretically, clear and relevant teaching materials can support learning orientation, but the analysis of the perceived teaching materials scores in this study did not show a significant linear relationship with motivation. This finding does not imply that teaching materials are unimportant for learning. The non-significant result simply indicates that, given the data and sample size, there is no evidence of a significant linear relationship.

One possible explanation is that learning motivation is a multidimensional construct. The motivational instruments in this study included intrinsic and extrinsic motivation, academic goals, personal achievement, initiative, and time management. These components may be influenced by learning experiences, social support, interests, and goals that are not fully represented by the learning materials perception scores.

Another explanation relates to sample size. A sample of 20 students provides direct information about the class group studied, but correlation estimates can be imprecise and the test's power to detect small relationships can be limited. Therefore, nonsignificant results should not be interpreted as definitive evidence that a relationship does not exist in the broader

population. Studies with multiple classes or schools and a larger number of respondents may provide more stable estimates. Replications should also maintain construct definitions and report sample selection procedures consistently to ensure comparability. Longitudinal and meta-analytic findings suggest that relationships between motivational constructs need to be interpreted by considering temporal sequence, differences in context, and precision of estimates (Talsma et al., 2018; Wijnia et al., 2024). Longitudinal and meta-analytic findings suggest that relationships between motivational constructs need to be interpreted by considering temporal sequence, differences in context, and precision of estimates (Talsma et al., 2018; Wijnia et al., 2024). Longitudinal and meta-analytic findings suggest that relationships between motivational constructs need to be interpreted taking into account temporal sequence, contextual differences, and estimation precision (Talsma et al., 2018; Wijnia et al., 2024).

Measurement quality is an important consideration. Cronbach's alpha coefficients were 0.971 for the 38 perception items and 0.970 for the 30 motivation items. Both values indicate high internal consistency by common criteria, but alpha does not, by itself, prove construct validity, unidimensionality, or the appropriateness of individual items. Very high alpha values can also indicate content similarity between items, so the instrument's structure still needs to be considered. The instrument test report stated that the item met the validity criteria based on the item correlation compared to the table *r* value of 0.6319. This critical value depends on the sample size and testing procedure. The alpha coefficient and the table *r* have different functions: alpha measures internal consistency, while item validity requires evidence from appropriate testing procedures.

The practical implication of these results is that teachers should not rely solely on the assumption that improving instructional materials will automatically improve motivation. Evaluation of instructional materials remains appropriate to ensure clarity, relevance, sequence, technical examples, and ease of access. However, such evaluation should be complemented by attention to learning objectives, practice opportunities, feedback, classroom climate, social support, and independent learning strategies. This recommendation represents an educational implication that aligns with the multidimensional nature of motivation, not an effect directly tested by this study. This recommendation aligns with the literature emphasizing that learning resources, instructor support, and learning strategies need to be contextually tailored and should not be assumed to produce uniform motivational responses (Sutirman et al., 2022; Sharizan et al., 2024; Gladstone et al., 2025). These recommendations are in line with literature emphasizing that learning resources, teacher support, and learning strategies need to be designed contextually and are not assumed to produce uniform motivational responses (Sutirman et al., 2022; Sharizan et al., 2024; Gladstone et al., 2025).

For the Motorcycle Chassis Maintenance course, teachers can ask students for specific feedback on areas of the material that are easy or difficult to understand, technical terms that need to be re-explained, and the relationship between written material and practical activities. This feedback can be used to iteratively improve the teaching materials. The use of component examples, illustrations, work sequences, and reflection questions can be considered, depending on school resources. However, the effectiveness of these strategies needs to be evaluated separately through intervention research or before-after designs with adequate procedures.

E. CONCLUSION

First, students' perceptions of the teacher's teaching materials obtained an average score of 152.45 (SD=16.20) out of 38 items. With a theoretical score range of 38–190 and a low category limit of 38–88, medium 89–139, and high 140–190, the group mean is in the high category. Second, students' learning motivation obtained an average score of 117.30 (SD=12.77) out of 30 items. With a theoretical score range of 30–150 and a low category limit of 30–70, medium 71–110, and high 111–150, the group mean is in the high category. Third,

the Pearson correlation test produced $r=0.014$ and $p=0.952$ (two-tailed; $\alpha=0.05$; $n=20$). Based on the coefficient interpretation guidelines in the research source, the absolute value of r of 0.014 is in the very low correlation category (0.00–0.199). Since $p>0.05$, the relationship is not statistically significant. Therefore, this study concludes that in the studied classes, there was no significant linear relationship between students' perceptions of the teacher's teaching materials and their learning motivation. A high mean for both variables does not necessarily indicate a correlation; the score levels of each variable and the relationship between them are two separate analytical findings.

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